What is claimed is:

1. A diamond semiconductor comprising a high-quality thin diamond film layer with few crystal defects and few impurities, implanted with ions of dopant elements and controllable in conductivity determined by a kind and a concentration of the dopant elements.

2. The diamond semiconductor according to claim 1, wherein said high-quality thin diamond film layer is capable of emitting ultraviolet light at room temperature by excitation using electron beam irradiation when it has a thickness of not less than 200 nm.

3. A method for the fabrication of a diamond semiconductor, comprising the step of implanting ions of dopant elements into a high-quality thin diamond film layer with few crystal defects and few impurities under conditions that can attain given distribution of concentrations of the dopant elements and with the high-quality thin diamond film layer kept to a temperature in accordance with the conditions so as not to be graphitized, to thereby enable the diamond semiconductor to have conductivity determined by a kind and a concentration of the dopant elements.

4. The method according to claim 3, wherein said high-quality thin diamond film layer is capable of emitting ultraviolet light at room temperature by excitation using electron beam irradiation when it has a thickness of not less than 200 nm.

5. The method according to claim 3, wherein said conditions are implantation energy in the range of 10 keV to 1000 keV and an ion implantation amount in the range of 1×10^{16} to $1 \times 10^{21}/cm^3$.

6. The method according to claim 3, wherein said high-quality thin diamond film layer is kept at a temperature of room temperature to 800℃ when implanted with the ions.